



(11) EP 1 715 674 A3

(12)

EUROPEAN PATENT APPLICATION

(88) Date of publication A3:
19.11.2008 Bulletin 2008/47(51) Int Cl.:
H04N 1/401 (2006.01) G03G 21/20 (2006.01)
G03G 15/04 (2006.01)(43) Date of publication A2:
25.10.2006 Bulletin 2006/43

(21) Application number: 06008303.7

(22) Date of filing: 21.04.2006

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI
SK TR**

Designated Extension States:

AL BA HR MK YU(30) Priority: 21.04.2005 JP 2005123155
21.04.2005 JP 2005123156
21.04.2005 JP 2005123157
21.04.2005 JP 2005123158
13.05.2005 JP 2005140620
13.05.2005 JP 2005140621
23.05.2005 JP 2005148972(71) Applicant: **Seiko Epson Corporation**
Shinjuku-ku
Tokyo 163-0811 (JP)(72) Inventors:

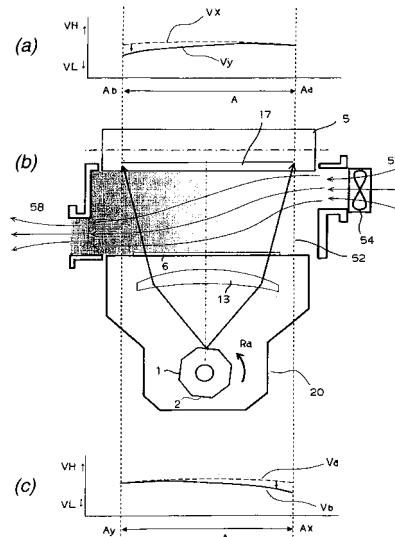
- Sowa, Takeshi**
Seiko Epson Corporation
Suwa-shi
Nagano 392-8502 (JP)
- Kanazawa, Masayuki**
Seiko Epson Corporation
Suwa-shi
Nagano 392-8502 (JP)
- Mitsui, Yoichi**
Seiko Epson Corporation
Suwa-shi
Nagano 392-8502 (JP)
- Fukumoto, Takatomo**
Seiko Epson Corporation
Suwa-shi
Nagano 392-8502 (JP)

(74) Representative: **HOFFMANN EITLE**
Patent- und Rechtsanwälte
Arabellastrasse 4
81925 München (DE)

(54) Image forming apparatus

(57) An image forming apparatus including: a photoconductor (5), adapted such that an electrostatic latent image is formed thereon and extending in a first direction; and an optical scanner (20), operable to emit a light beam to expose the photoconductor (5) while scanning in the first direction, wherein: the photoconductor (5) and the optical scanner (20) define a space therebetween; and the space allows air to flow therethrough in the first direction. In advantageous embodiments the optical scanner is arranged such that a light quantity distribution thereof increases in the first direction; the photoconductor is arranged such that a sensitivity distribution increases or decreases in the first direction; the space allows air to flow therethrough in a second direction opposite to the first direction; or a combination thereof.

FIG. 1





EUROPEAN SEARCH REPORT

Application Number
EP 06 00 8303

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (IPC)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
X	JP 2001 318577 A (KYOCERA CORP; KYOCERA MITA CORP) 16 November 2001 (2001-11-16) * abstract; figures 2-5 * * paragraphs [0004], [0010] - [0020] * -----	1-7	INV. H04N1/401 G03G21/20 G03G15/04
X	US 2004/052545 A1 (SATOH OSAMU [JP]) 18 March 2004 (2004-03-18) * paragraphs [0058] - [0076], [0121], [0177]; figures 1,2a,3 * -----	1-11	
D, A	JP 05 236214 A (SEIKO EPSON CORP) 10 September 1993 (1993-09-10) * paragraph [0008] * -----	5-7,18, 19	
A	JP 11 160895 A (FUJI XEROX CO LTD) 18 June 1999 (1999-06-18) * abstract; figure 1 * * paragraph [0037]; figure 1 * * paragraph [0037] * -----	8-12	
X	JP 2002 196635 A (KYOCERA MITA CORP) 12 July 2002 (2002-07-12) * abstract; figures 1,2 * -----	13-19	TECHNICAL FIELDS SEARCHED (IPC)
X	US 2005/074254 A1 (MAEDA MASAHIRO [JP]) 7 April 2005 (2005-04-07) * paragraphs [0003], [0004], [0024] - [0030]; figures 1a,1b * -----	13,14	H04N B41J G03G G02B
A	JP 09 164718 A (HITACHI KOKI KK) 24 June 1997 (1997-06-24) * abstract; figures 1,4 * * paragraphs [0008] - [0013] * -----	15	
A	JP 57 066416 A (RICOH KK) 22 April 1982 (1982-04-22) * abstract; figures 1,2 * -----	5-7,18, 19	
		-/-	
The present search report has been drawn up for all claims			
2	Place of search Munich	Date of completion of the search 14 October 2008	Examiner Billmann, Frank
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			



EUROPEAN SEARCH REPORT

Application Number
EP 06 00 8303

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (IPC)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
X	US 5 952 649 A (AMADA TAKU [JP]) 14 September 1999 (1999-09-14) * figures 1-5 * * column 3, line 29 - column 4, line 64 * * column 1, line 38 - line 67 * -----	20-28	TECHNICAL FIELDS SEARCHED (IPC)
X	JP 62 235865 A (CANON KK) 16 October 1987 (1987-10-16) * abstract; figures 2,3 * -----	20,21,23	
2 The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
Munich		14 October 2008	Billmann, Frank
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			



Application Number

EP 06 00 8303

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).

**LACK OF UNITY OF INVENTION
SHEET B**Application Number
EP 06 00 8303

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-7

Scanning property selection (i.e., scan direction/ scan light quantity distribution) in an image forming apparatus being adapted such that air flows in a photoconductor extension direction in a space between a photoconductor and an optical scanner.

The technical problem to be solved by these features is to select one of a plurality of scanning properties for such an image forming apparatus having an air flow in a photoconductor extension direction in a space between a photoconductor and an optical scanner.

2. claims: 13-19

Scanning property selection (i.e., scan direction/ scan light quantity distribution) in an image forming apparatus being adapted such that air flows in a photoconductor extension direction in a space between a charging device and an optical scanner.

The technical problem to be solved by these features is to select one of a plurality of scanning properties for such an image forming apparatus having an air flow in a photoconductor extension direction in a space between a charging device and an optical scanner.

3. claims: 8-12,20-28

Image forming apparatus comprising a photoconductor having a photoconductor sensitivity distribution in the extension direction of the photoconductor and an optical scanner and means to improve image quality.

The technical problem to be solved by these features is to provide means for improving image quality in case of a photoconductor produced by a dip coating method.

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 06 00 8303

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on. The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

14-10-2008

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
JP 2001318577	A	16-11-2001	NONE		
US 2004052545	A1	18-03-2004	NONE		
JP 5236214	A	10-09-1993	JP 3266926 B2		18-03-2002
JP 11160895	A	18-06-1999	NONE		
JP 2002196635	A	12-07-2002	NONE		
US 2005074254	A1	07-04-2005	CN 1480798 A CN 2684236 Y EP 1367454 A1		10-03-2004 09-03-2005 03-12-2003
JP 9164718	A	24-06-1997	NONE		
JP 57066416	A	22-04-1982	JP 1353448 C JP 61020848 B		11-12-1986 24-05-1986
US 5952649	A	14-09-1999	JP 10058738 A		03-03-1998
JP 62235865	A	16-10-1987	NONE		